HIV/AIDS Knowledge and Health-Related Attitudes and Behaviors Among Deaf and Hearing Adolescents in Southern Brazil

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HIV/AIDS **knowledge** and health-related attitudes and behaviors among deaf and hearing adolescents in southern Brazil are described. Forty-two deaf students attending a special nonresidential public school for the deaf and 50 hearing students attending a regular public school, ages 15–21 years, answered a computer-assisted questionnaire. (There was simultaneous video translation of questions to Brazilian Sign Language.) A branched decision-tree structure was used to determine level of sexual experience and hearing status. Deaf participants scored lower on HIV/AIDS knowledge, demonstrating a need to improve school-based instruction and develop campaigns tailored to this group's requirements. Though the hearing students reported more sexual activity than the deaf students, no other significant differences were found in health-related attitudes and behaviors. Two findings of concern are the high rate of sexual abuse reported by deaf participants and the large number of deaf adolescents reporting having a friend with AIDS.

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Adolescence is a critical period in human development. Although there are many developmental models and psychological theories devoted to explaining adolescence, most agree that the main tasks to be addressed in order to respond to the biological, social, and cultural changes inherent in adolescence are related to body image, sex roles and sexual relations, economic and emotional independence, and occupational, family, and social roles (Chapin, 2000). These developmental issues are experienced with varying degrees of difficulty, but on the whole, young people's vulnerability is associated with several potentially risky situations that tend to converge in the transition from childhood to adulthood: Getting to know oneself often involves experimenting with one's limits, going beyond family traditions, and getting involved with different social groups.

Preoccupation with sexual behavior has increased since the onset of the AIDS pandemic. The impact it has on adolescents' lives transforms what could be seen as part of one's normal development or transition to adult sexuality. Williams, Holmbeck, and Greenley (2002) have reported that HIV/AIDS is a leading cause of morbidity and mortality in young adults. It is estimated that 5,000 young people ages 15 to 24 years become infected with HIV in the world every day. This works out to almost 2 million new infections each year. Out of the 40 million individuals worldwide who are living with HIV, 10 million are young people (Joint United Nations Programme on HIV/AIDS, 2006).

In this scenario, deaf adolescents are in the midst of two mutually reinforcing

experiences. As adolescents, they face all the developmental tasks that characterize this period of life; being deaf, they belong to a subculture within a broader one (deaf vs. hearing), and they must deal with the resultant difficulties and their consequences in terms of communication, education, health access, and work opportunities. Therefore, adolescence will be especially colored by the experience of growing up deaf in a hearing world (approximately 90% of deaf children have hearing parents [Barnett, 1999; Job, 2004; Marchesi, 1993]).

Deaf Adolescents: The Knowledge Gap Issue

The Joint United Nations Programme on HIV/AIDS (2006) reports that for young people, knowledge and information are the first line of defense against the risks associated with sexual behavior. If adolescents in general are considered to be at high risk because they may not know which behaviors place them at risk, deaf adolescents are at a greater risk "because their communication difficulties hinder their ability to acquire accurate information" (Baker-Duncan, Dancer, Detholyn, Highly, & Gibson, 1997, p. 371). Empirical studies have shown that there are indeed reasons for concern. Insufficient knowledge to make well-informed choices about sexual health behavior, difficulties communicating with medical providers, inadequate understanding of AIDS resulting from communication barriers, cultural traditions, low literacy levels, and relative isolation of many deaf people have been repeatedly reported (Baker-Duncan et al., 1997; Bat-Chava, Martin, & Kosciw, 2005; Job, 2004; Joseph, Sawyer, & Desmond, 1995; Woodroffe, Gorenflo, Meador, & Zazove, 1998).

The few studies conducted in developing countries are consistent with those mentioned above. In India, limited awareness of sexually transmitted diseases and HIV/AIDS is general among the deaf (Patil & Gopinath, 2000). In Brazil, a qualitative study was developed by Glat (2004) with deaf youths and with youths who had visual, mental, or physical disabilities. Glat found that the risks faced by young people with disabilities are increased by lack of information, overprotection, underestimation of their sexual lives and capacities, and their vulnerability related to difficulty obtaining information or recognizing risk situations. Groce, Yousafzai, Dlamini, Zalud, and Wirz (2006) surveyed 191 rural and urban hearing and deaf adults in Swaziland and identified significant differences in levels of knowledge about HIV/AIDS. In Jamaica, Hamilton and Williams (2005) found that adolescents' knowledge was uneven, incomplete, and incorrect regarding some important aspects across all four disability groups (i.e., auditory, visual, mental, and physical).

More research needs to be done to obtain a clear understanding of the situation of deaf youths in the developing world, especially in large and heterogeneous countries such as Brazil, where cultural differences and socioeconomic disparities among regions and subgroups contribute to variations in adolescents' behaviors. The present study was conducted to investigate deaf youths' HIV/AIDS knowledge in comparison to that of hearing adolescents. We hypothesized that our findings in southern Brazil would be consistent with those reported in the international literature. We also examined possible differences in health-related attitudes and behaviors among these two groups of youths.

Method

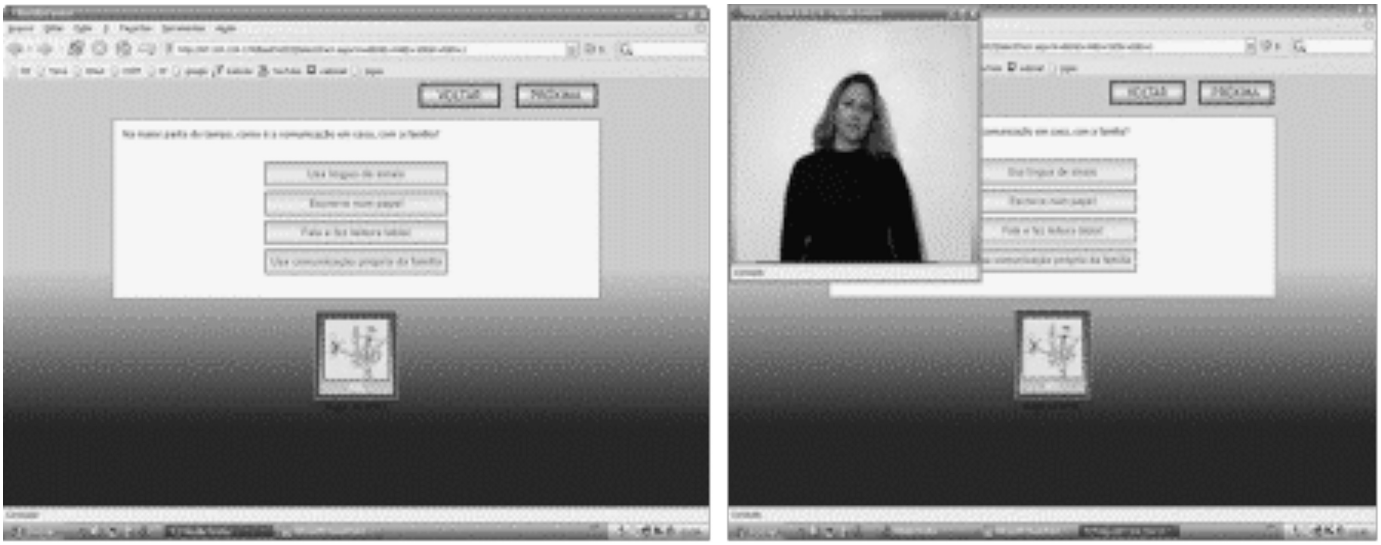
Participants

Deaf students attending a special nonresidential school for the deaf and hearing students attending a regular school, both in the same neighborhood in Caxias do Sul (a city of about 550,000 in the Brazilian state of Rio Grande do Sul), were invited to participate in the present study. The schools provide public elementary and secondary education. A total of 92 students (42 deaf and 50 hearing) volunteered to participate. The 42 deaf students (21 boys and 21 girls) were between 15 and 21 years of age (M = 17.8, SD = 2.1). The 50 hearing students were between 15 and 19 years of age (M = 16.9, SD = 0.8). Nineteen were boys (38%) and 31 were girls (62%).

Instruments

A computer-assisted self-administered questionnaire (an audio computer-assisted self-interview, or ACASI) that allowed simultaneous video translation of questions into Brazilian Sign Language (Libras) was used to provide accessibility to deaf participants. The questions were filmed in Libras by one male and one female deaf teacher, both fluent signers, with the assistance of an official sign language interpreter and the lead author of the present article (who is familiar with sign language). Deaf participants could use the video translation as they pleased. The program used a friendly and motivating interface (see Figure 1). The questionnaire had a branched decision-tree structure: Questions could be adjusted to the respondent's stage of development so that those who were less sexually experienced would not be exposed to more sexually explicit material, and so that only the deaf respondents were offered certain specific questions related to deafness. A full description of the methods can be found in Bisol, Sperb, and Moreno-Black (2008). Information regarding the levels and causes of hearing loss were abstracted from records and statistics kept by the special school for the deaf.

Figure 1
Questionnaire interface



Procedure

Students who were willing to participate were identified, and informed consent was obtained from those over the age of 18 years. For students 17 and under, their consent as well as that of their parents was obtained. Transportation was provided to take the students from the school to the Universidade de Caxias do Sul computer laboratory in groups of 15 to 17. One teacher volunteered from each school to accompany the groups and the researcher (the lead author). The students could choose any of the 30 computers that were available; these were arranged in such a way that the students could not see one another's screens. Initial instructions were given in Portuguese and sign language by the researcher. An official sign language interpreter was present to certify that instructions were consistent. Time was provided to clarify anything that was not clear to the students, and the first question ("What is your age?") was discussed openly with students in order to test their understanding of the task. The study was approved by the institutional review boards of the University of Miami Miller School of Medicine, Universidade de Caxias do Sul, and Universidade Federal do Rio Grande do Sul.

Results

Data were analyzed using the SPSS 14.0 for Windows software package. Frequency and descriptive statistics were calculated to check for data normality and all relevant characteristics. Student's *t* test, chi-square analysis, Fischer's exact test, and analysis of variance were used to test for significant differences.

General Characteristics of the Deaf Participants

The majority of the deaf participants lived with hearing parents (hearing father, 97.6%; hearing mother, 92.7%). The deaf participants reported that communication at home was conducted most commonly in sign language (41.5%), followed by speaking and speechreading (26.8%), home signs (22.0%), and writing (9.8%). (The total percentage exceeds 100.0 because of rounding.) Most of the deaf participants were profoundly deaf (65.1%); hearing loss was severe in 14.0% and moderate in 2.3%. Level of hearing loss was not known in 18.6% of cases. Rubella was found to be the leading known etiology (32.6%), followed by unknown causes (21.0%), congenital causes (11.6%), meningitis (9.3%), and premature birth (2.3%). Cause of hearing loss was not provided in 23.2% of cases. None of the deaf participants used a hearing aid or had a cochlear implant. Sign language prevailed in school; classes were taught in Libras, and Portuguese was taught as a second language.

HIV/AIDS Knowledge

There were significant differences in education level and knowledge of HIV/AIDS between the hearing and deaf students. Among the deaf, 61.9% attended elementary school and 38.1% attended secondary school, while all of the hearing attended secondary school (Fisher's exact test, $p < .001$). Sixty-six percent of the hearing students were in the last year of secondary school.

In terms of questions about HIV/AIDS knowledge, the average number of correct answers among the hearing

Table 1
Correct Answers on HIV/AIDS Knowledge, by Hearing Status and Gender

	Hearing (n = 50)		*Deaf (n = 42)*		*All*	
	M	*SD*	*M*	*SD*	*M*	*SD*
Boys (*n* = 40)	12.58	1.84	6.86	3.94	9.58	4.23
Girls (*n* = 52)	12.32	1.58	8.19	3.70	10.65	3.32
All	12.42	1.67	7.52	3.83	10.18	3.76

Note. This part of the questionnaire consisted of 16 questions.

students was significantly higher than the average among the deaf students, $F(1,88) = 66.0$, $p < .001$. Gender effects were not observed (see Table 1).

Only 47% of the deaf students were able to correctly answer at least 7 of the 16 questions, while all of the hearing students answered at least 8 of the items correctly. Table 2 presents each of the 16 questions related to knowledge. No differences were found between the hearing and deaf students on three important questions regarding HIV transmission: through oral sex, anal sex, and sex during menstruation. The deaf students, however, were more likely than the hearing students to choose the alternative "do not know."

There were also differences between the two groups in their answers to open-ended questions about HIV/AIDS prevention. Table 3 provides data on the answers to each behavioral item. For instance, the use of condoms was mentioned 45 times by the hearing participants and 15 times by the deaf participants. Sixteen answers given by the deaf participants did not make sense (e.g., "people please avoid AIDS," "I don't want HIV"). Other answers that were mentioned at least twice were have safe sex, talk with your partner, respect your partner, ask your partner to get tested, be careful with syringes, do not take drugs, be careful when you go to parties, be careful with blood, avoid having sex (two answers in the deaf group), and avoid having oral sex. None of the hearing participants mentioned abstinence as a means of avoiding AIDS.

Health-Related Attitudes and Behaviors

No differences were found related to relationships when the hearing and deaf youths' responses were compared (see Table 4).

Sixty-two percent ($n = 31$) of the hearing participants and 33.3% ($n = 14$) of the deaf participants (Fisher's Exact Test: $p = .007$) responded positively to the question "Have you ever

Table 2
Response Rates, by Percentage, to Questions About HIV/AIDS Knowledge

	Group							
	Hearing			*Deaf*				
Questions	*Yes*	*No*	*Do not know*	*Yes*	*No*	*Do not know*	$X^2_{(2)}$	*p*
Transmission by sex without condoms	96.0*	4.0	0.0	54.8	14.3	31.0*	23.28	< .001
Less chance of transmission using condoms	96.0*	4.0	0.0	50.0	14.3	35.7*	27.07	< .001
Transmission by kissing in the mouth	16.0	74.0*	10.0	54.8*	28.6	16.7	19.80	< .001
Transmission by oral sex	42.0	28.0	30.0	50.0	21.4	28.6	0.73	.694
Transmission by sex possible if you know partner well	86.0*	14.0	0.0	47.6	21.4	31.0*	21.11	< .001
Transmission by anal sex	60.0	14.0	26.0	52.4	19.0	28.6	0.65	.724
Transmission by sex during menstruation	42.0	30.0	28.0	33.3	31.0	35.7	0.89	.641
Transmission by blood transfusion	98.0*	2.0	0.0	64.3	19.0*	16.7*	18.26	< .001
Transmission between married couples	92.0*	6.0	2.0	16.7	52.4*	31.0*	53.13	< .001
More chance of transmission if multiple sex partners	98.0*	2.0	0	40.5	16.7*	42.9*	37.60	< .001
Transmission can occur between steady partners	80.0	18.0	2.0	64.3	14.3	21.4*	8.89	.012
Can know if someone has AIDS only by looking	2.0	94.0*	4.0	26.2*	33.3	40.5*	37.62	< .001
Can be HIV infected without being sick	52.0*	28.0	20.0	31.0	26.2	42.9*	6.33	.042
Transmission from pregnant woman to her baby	90.0*	8.0	2.0	35.7	33.3*	31.0*	30.38	< .001
Transmission by sharing needles	100.0*	0.0	0.0	61.9	31.0*	7.1	23.06	< .001
People don't need to worry because there is treatment	0.0	100.0*	0.0	11.9*	61.9	26.2*	23.06	< .001

Note. Some sets of percentages do not total 100.0 because of rounding.
* *p* adjusted standardized: $p < .05$.

had sex (oral, vaginal, anal)?" Also, a larger percentage of boys (62.5%) were sexually active than girls (38.5%) (Fisher's Exact Test: $p = .035$). The hearing youths became sexually active at 15.17 years ($SD = 1.60$), and the deaf youths at 14.50 years ($SD = 3.06$; $t(13, 5) = .72, p = .486$); no significant difference was found between boys and girls (boys, $M = 14.50$, $SD = 1.74$; girls, $M = 15.50$, $SD = 2.37$; $t(40) = 1.57, p = .125$). Thirty-one percent of the deaf participants (6 boys and 7 girls) reported a history of sexual abuse, compared to only 2% of the hearing students (Fisher's Exact Test: $p < .001$). Among the deaf participants, 64.3% reported having had sex only with deaf people, 21.4% with hearing and deaf people, and 14.3% only with hearing people.

Those who were sexually active reported their behaviors in terms of the number of sexual partners and condom use (see Table 5). No significant difference was found between the deaf and hearing participants in the number of sexual partners in the 12 months preceding the survey. Three deaf participants acknowledged having had six partners or more. No differences were found for patterns of condom use, or for condom use the last time study participants had sex.

Sixty-six percent of the hearing participants and 54.8% of the deaf participants reported that they thought their friends had already had sex. Nineteen percent of the deaf participants reported that they had a friend with AIDS, compared with none (0%) of the hearing ($X^{(3)} = 15.96, p = .001$). Rates of alcohol use differed: 76.0% of the hearing participants and 54.8% of the deaf participants reported drinking (Fischer's Exact Test: $p = .046$). There were no significant differences regarding cigarette smoking or illicit drug use: 10% of the hearing participants and 19% of the deaf participants (Fisher's Exact Test: $p = .243$) reported tobacco use, and 6% of the hearing and 16% of the deaf (Fisher's Exact Test: $p = .177$) reported illicit drug use. Eight percent of the hearing participants and 21.4% of the deaf participants reported that they had been tested for HIV/AIDS (Fisher's Exact Test: $p = .078$), while 67.4% of the hearing and 42.1% of the deaf reported a willingness to be tested (Fisher's Exact Test: $p = .027$).

Table 3
Answers to Open-Ended Question About How to Avoid Getting AIDS

	Answers Number of times each answer was mentioned					
	Hearing (N = 50)		*Deaf (N = 42)*		*Total*	
	n	*%*	*n*	*%*	*n*	*%*
Use condoms	45	90.0	15	35.7	60	65.2
Know your partner well / trust her or him	12	24.0	-	-	12	13.0
Be well informed, conscious, responsible	12	24.0	3	7.1	15	16.3
Have only one sexual partner	3	6.0	-	-	3	3.3
Use contraceptives	3	6.0	2	4.8	5	5.4
Be tested	3	6.0	-	-	3	3.3
Take care of yourself	--	-	5	11.9	5	5.4
Answers that did not make sense	-	-	16	38.1	16	17.4

Table 4
Partner Information

	Hearing (N = 50)		*Deaf (N =42)*	
	n	*%*	*n*	*%*
Do not have a boyfriend, girlfriend, or any casual relations at the moment	19	38	12	28.6
Date without commitment ("make out")	16	32	12	28.6
Have a boyfriend (girlfriend) or partner	15	30	15	35.7
Are married or live with a partner	0	0	3	7.1

Table 5
Sexual Partners and Condom Use

		Hearing (N = 31)		*Deaf (N = 14)*		*Total*
		n	*%*	*n*	*%*	*%*
Number of sexual partners	none	5	16.1	2	14.3	15.6
in last 12 months	1	16	51.6	6	42.9	48.9
	2 to 5	10	32.3	3	21.4	28.9
	6 or more	0	0.0	3	21.4	6.7
Condom use when having sex	always	18	58.1	7	50.0	55.6
	sometimes	12	38.7	4	28.6	35.6
	never	1	3.2	3	21.4	8.9
Condom used last time had sex	yes	20	64.5	10	71.4	66.7

Discussion

One of the objectives of the present study was to investigate deaf youths' HIV/AIDS knowledge in the Brazilian state of Rio Grande do Sul. Hearing adolescents of similar ages and sociocultural characteristics were also in-

cluded to permit comparisons. Lower levels of school education and of HIV/AIDS knowledge were found among the deaf youths. Unfortunately, these findings are consistent with those of several studies published in North America in the last decade (see Job, 2004).

In Brazil, the education of the deaf has overcome several challenges since the first school for deaf boys was founded in 1857. Bilingual education has become the preferred pedagogical method of a large number of special schools for the deaf since it was introduced in the country in the 1990s, concurrent with the Deaf community's fight for its rights (Meirelles & Spinillo, 2004). Brazilian Sign Language (Libras) was recognized as an official language in 2002. These advances, however, do not seem to guarantee the quality of education deaf children need in order to obtain the knowledge that will enable them to achieve full inclusion in society. The responses given by the deaf participants to the open-ended question about HIV/AIDS prevention—16 deaf respondents wrote answers that made no sense—reinforce concerns about the quality of education of the deaf.

The gap in terms of HIV/AIDS knowledge when the responses given by the deaf adolescents were compared with those given by the hearing adolescents is significant. Moreover, even when only the results within the deaf group were analyzed, it was evident that their knowledge was insufficient. For instance, there were three questions that directly addressed what the deaf respondents believed about sexual partners. The deaf adolescents did not consistently recognize that HIV/AIDS can be transmitted even if one knows one's sexual partner well, is married, or always has sex with the same boyfriend or girlfriend. Considering that the deaf tend to socialize and choose partners within the relatively closed Deaf community (Barnett, 1999), most of them know their sexual partners from school or from Deaf community activities. The fact that 19% of the deaf participants reported that they had a friend with AIDS does not necessarily mean that more deaf people are infected with AIDS. It may be a consequence of living in a close-knit group where "everybody knows everybody," and confidentiality is harder to maintain.

Interestingly, there were no significant differences between the deaf and hearing participants regarding knowledge of HIV/AIDS transmission in the specific contexts of oral sex, anal, sex and sex during menstruation. This suggests that information is reaching deaf youths such as those who took part in the present study, even though this information is incomplete and uneven. Heuttel and Rothstein (2001) found that deaf American students obtained most of their information about HIV/AIDS from family and friends, but further research should be done to see if this is the case in other countries.

The high rate of sexual abuse reported by the deaf is unfortunate but not surprising. Kvam (2004) studied the prevalence of childhood sexual abuse among deaf children in Norway and found that deaf youths reported abuse two to three times more frequently than their hearing counterparts. The finding that deaf children and other children with disabilities are at increased risk for abuse when compared to children without disabilities is strongly supported by the literature (Embry & Grossman, 2006/2007). Some of the other factors that add to the risk of sexual abuse, as well as of physical and emotional violence, and that are frequently observed, include families with poor skills in communication and conflict management, stepfamilies, families facing severe social and economic difficulties, multiple caregivers, and children who have been socially or physically isolated (Suárez, Uribe, & Alfonso, 2006). Fear, shame, and avoidance of sexual relations related to the traumatic experience of being sexually abused might in part explain why fewer deaf participants than hearing participants reported having had sex.

Prevention campaigns in Brazil do not emphasize abstinence over condom use. Sexual topics are discussed openly in Brazilian media and schools (Paiva, Pupo, & Barboza, 2006). In the open-ended questions, none of the hearing participants in the present study mentioned abstinence as a way to prevent HIV/AIDS, and only two deaf participants did. The age of onset of sexual activity did not significantly differ between the deaf (14.50 years) and the hearing (15.17). These data are in accord with the mean age reported by researchers for Brazilian youth (Borges & Schor, 2005; Castro, Abramovay, & Silva, 2004; Glat, 2004).

The present study also examined health-related attitudes and behaviors. There is little evidence that an individual's knowledge and attitudes toward AIDS significantly shape his or her behavior. Becker and Joseph (1988) stated that there might be some "threshold" effect so that beyond a certain level, further increments in knowledge or improved attitudes no longer influence behaviors. Bajos, Ducot, Spencer, Spira, and the SCSF Group (1997) affirmed that health-related behaviors are the product of a complex interaction among personal history and social and cultural threads that involve, among other factors, an individual's life story and the logics of gender, social networks, and milieus of sociability, and would depend ultimately on the context of the relationship. Paiva, Peres, and Blessa (2002) analyzed the results

of campaigns in Brazil targeting youths: After 10 years of a prevention program in São Paulo, young people had better knowledge of the need to protect themselves against HIV, but few changed their sexual behaviors. This might also explain the results found in our study. Although significant differences in HIV/AIDS knowledge were apparent, we did not find evidence of relevant differences in health-related attitudes and behaviors when the deaf and hearing adolescents were compared.

Conclusions

The present study is the first to use a computer-assisted questionnaire to describe HIV/AIDS knowledge and health-related attitudes and behaviors among deaf and hearing adolescents in the Brazilian state of Rio Grande do Sul. Certain study limitations and questions merit further investigation. First, a small sample chosen by convenience was used, so results cannot be generalized to other deaf students in Brazil. Although the literature supports most of our findings, those concerning health-related attitudes and behaviors should be considered with special caution. Further research with larger groups will be needed to examine family background and past experiences of the deaf and the hearing, and to consider gender and social class issues as well as the social context of the relationships of deaf adolescents.

Second, language barriers might still be an issue. The computer-assisted questionnaire with simultaneous translation to sign language was a methodological high point of our study, used for the first time in Brazil in a study of this kind. It provided a confidential and motivating environment (Kissinger et al., 1999; Michaud, Narring, & Ferron, 1999; Noia, Schinke, Pena, & Schwinn, 2004), especially for the deaf adolescents, in that they were able to use a mode of communication with which they felt more comfortable, and which was designed after a careful preliminary study with focus groups (Bisol et al., 2008). Even so, no precautions were taken to certify that all deaf students were equally skilled in sign language, on the assumption that their attendance at a bilingual school where classes were taught in sign language assured adequate comprehension. Even so, further studies should consider the variable of communication mode, which might explain instances of incoherent responses such as those seen in the open-ended questions.

Despite these limitations, the present study sheds light on several issues relevant to the understanding of HIV/AIDS–related issues among deaf youths in Brazil. Our findings underscore the need to improve the quality of the country's attention to the Deaf community at several levels:

1. Upgrading the quality of school-based instruction and examining the emphasis that sexual education receives in schools for the deaf.
2. Developing prevention campaigns especially tailored to the communication needs of deaf youth.
3. Developing prevention campaigns that take into consideration cultural differences, for instance, the tendency found among the deaf to think that they are safe if they are well acquainted with the person with whom they are partnering.
4. Creating more efficient ways to protect children and adolescents with special needs against all kinds of violence. Comparative studies in other regions of Brazil and in other Latin American countries could be developed to estimate the prevalence of sexual abuse as well as to examine risk factors.

Relative to their hearing counterparts, the deaf participants showed very low levels of HIV/AIDS knowledge, though health-related attitudes and behaviors among the deaf and hearing participants were similar. These similarities raise questions regarding the "commonsense" views of deaf individuals as socially inadequate or sexually immature. They remind researchers and health care providers that they, also, are dealing with the general issues that characterize adolescence. The similarities we found also raise questions about the excessive emphasis placed on knowledge for the promotion of behavior change, indicating that the factors that contribute to the adoption and maintenance of certain behaviors despite the possession of knowledge must be addressed in future research. It is a global challenge to constantly renew strategies for research, prevention, and health promotion among diverse, heterogeneous, and ever-transforming youths.

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